B+K Power Supply
1610 / 1630

INSTRUCTION MANUAL

BK PRECISION
DYNASCAN CORPORATION

MODEL 1610 1630

DC POWER SUPPLY

BK PRECISION
DYNASCAN CORPORATION

TEST INSTRUMENT SAFETY

WARNING

Normal use of test equipment exposes you to a certain amount of danger from electrical shock because testing must sometimes be performed where exposed high voltage is present. An electrical shock causing 10 milliamps of current to pass through the heart will stop most human heartbeats. Voltage as low as 35 volts dc or ac rms should be considered dangerous and hazardous since it can produce a lethal current under certain conditions. Higher voltage poses an even greater threat because such voltage can more easily produce a lethal current. Your normal work habits should include all accepted practices that will prevent contact with exposed high voltage, and that will steer current away from your heart in case of accidental contact with a high voltage. You will significantly reduce the risk factor if you know and observe the following safety precautions:

1. There is little danger of electrical shock from the dc output of this power supply. However, there are several other possible test conditions using this power supply that can create a high voltage shock hazard:
   a. If the equipment under test is the "hot chassis" type, a serious shock hazard exists unless the equipment is unplugged (just turning off the equipment does not remove the hazard), or the precautions of step 8 are observed.
   b. If the equipment under test is "powered up" (and that equipment uses high voltage in any of its circuits), the power supply outputs may be floated to the potential at the point of connection. Remember that high voltage may appear at unexpected points in defective equipment. Do not float the power supply output to more than 500 volts peak with respect to chassis or earth ground.
   c. If the equipment under test is "off" (and that equipment uses high voltage in any of its circuits under normal operation), discharge high-voltage capacitors before making connections or tests. Some circuits retain high voltage long after the equipment is turned off.

(continued on inside back cover)

Instruction Manual
for
Model
1610 and 1630
DC POWER SUPPLY
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Model
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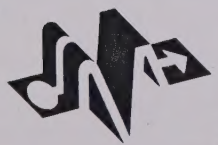
DC POWER SUPPLY



BK PRECISION
DYNASCAN CORPORATION
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Instruction Manual

for

Model

1610 and 1630

DC POWER SUPPLY

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INTRODUCTION

The **B & K-Precision** Model 1610 and 1630 DC Power Supplies are high quality, general purpose dc power sources. The two models are very similar to each other, and both are covered in this instruction manual. Each of these power supplies provides 0-30 volts dc output, adjustable with both coarse and fine controls for precise settability. The current output of the Model 1610 is 0-1 amp, while Model 1630 is 0-3 amps. Two current ranges, HI and LO, provide excellent current settability and meter resolution. Two large panel-mounted meters continuously monitor the output voltage and current.

These power supplies exhibit excellent regulation and low ripple characteristics. The circuit design incorporates a pre-regulator, which greatly reduces internal power dissipation at low output voltages. The styling is both attractive and functional. The mechanical configuration conserves bench space and allows for easy portability.

These instruments may be used in constant voltage or constant current applications. The crossover from constant voltage to constant current modes is smooth and automatic. LED's indicate the "CV" (constant voltage) or "CC" (constant current) mode of operation. In constant voltage applications, a current limit may be preset. When load variations cause the current to reach the preset limit, the unit then regulates output current rather than output voltage. Current limits are adjustable from 5% to 100% of maximum. In constant current applications, the maximum voltage may be preset. When load variations cause current to drop below the regulated value, the unit reverts to regulated voltage operation at the preset value.

Reverse polarity protection prevents accidental damage to the power supply from improper connection to an external voltage, and current limiting protects the equipment being powered, as well as the power supply.

The output is isolated from chassis and earth ground, which permits full flexibility of connections. When needed, the (+) or (-) polarity may be strapped to ground, or either polarity may be floated to an external voltage. Two supplies may be connected in series as a 0-to-60 volt power source, or two supplies may be connected in parallel, with suitable balancing resistors, for up to twice the output current.

These power supplies are well suited for a wide variety of electrical and electronics applications, including service shops, engineering labs, production testing, school laboratories, and home use by hobbyists.

FEATURES

0-30 VOLTS
Continuously variable over 0-to-30 volt range with coarse and fine controls.

0-1 AMP AND 0-3 AMP VERSIONS
0-to-1 amp (1610) and 0-to-3 amp (1630) models available. Each rated for continuous duty at full output current.

LABORATORY QUALITY
Excellent regulation, low ripple.

CONSTANT VOLTAGE OR CONSTANT CURRENT
Provides regulated dc voltage output or regulated dc current output. Crossover is smooth and automatic.

TWO CURRENT RANGES
HI-LO switch selects full output (0-1 A for Model 1610, 0-3 A for Model 1630), or half output (0-0.5 A for Model 1610, 0-1.5 A for Model 1630). LO range improves current settability and meter resolution at lower current values. Switch simultaneously selects range of adjustment and corresponding meter scale.

BUILT-IN METERING
Two large, easy-to-read meters continuously monitor output voltage and current.

LED INDICATORS
Act as pilot light and identify mode of operation.

PRE-REGULATOR
Limits internal dissipation for higher reliability.

ISOLATED OUTPUT
Either polarity may be floated or grounded.

OVERLOAD PROTECTION
Fully adjustable current limiting (from 5% to 100% of maximum output current) protects circuit under test and the power supply.

REVERSE POLARITY PROTECTION
Prevents damage to power supply from external voltage of reverse polarity.

STYLING
Modern functional styling. Configuration conserves bench space and aids portability. Logical, convenient layout of controls.

HOOK-UP CABLES
Supplied with red and black hook-up leads.

SPECIFICATIONS

	MODEL 1630	MODEL 1610
OUTPUT VOLTAGE	0 to 30 VDC, coarse and fine adjustment	0 to 30 VDC, coarse and fine adjustment
OUTPUT CURRENT HI Range LO Range	 0 to 3 A 0 to 1.5 A	 0 to 1 A 0 to 0.5A
CONSTANT VOLTAGE OPERATION		
Voltage Regulation Line (110-130 V) Load (no load to full load)	 ≤ 0.02% + 2 mV ≤ 0.02% + 3 mV	 ≤ 0.03% + 2 mV ≤ 0.04% + 3 mV
Recovery Time	≤ 200 µs typical	≤ 200 µs typical
Ripple Voltage Peak-to-Peak RMS	 ≤ 2 mV ≤ 1 mV	 ≤ 3 mV ≤ 2 mV
Temperature Coefficient 0° to +35° C	5 mV/° C typical	10 mV/° C typical

	MODEL 1630	MODEL 1610
CONSTANT CURRENT OPERATION		
Adjustable Current Limits	5% to 100% (0.15 A to 3 A)	5% to 100% (0.05 A to 1 A)
Current Regulation		
Line (110-130 V)	≤ 5 mA typical ≤ 9 mA maximum	≤ 6 mA typical ≤ 12 mA maximum
Load	≤ 5 mA typical ≤ 9 mA maximum	≤ 5 mA typical ≤ 12 mA maximum
Current Ripple	≤ 3 mA typical	≤ 2 mA typical
METERING		
Voltmeter		
Range	0 to 32 V	0 to 32 V
Accuracy	±2.5%	±2.5%
Ammeter		
HI Range	0 to 3.2 A	0 to 1.04 A
LO Range	0 to 1.6 A	0 to 0.52 A
Accuracy	±2.5%	±2.5%
POWER REQUIREMENTS	110/120/220/240 VAC ±10%, 50/60 Hz	110/120/220/240 VAC ±10%, 50/60 Hz
POWER CONSUMPTION	Approx. 170 W or less at full load	Approx. 60 W or less at full load

	MODEL 1630	MODEL 1610
PROTECTION	Reverse polarity protection, Current limiting	Reverse polarity protection, Current limiting
TEMPERATURE RANGE Operation Storage	 0° to +40° C -15° to +70° C	 0° to +40° C -15° to +70° C
DIMENSIONS (HxWxD)	172 x 119 x 305 mm 6-3/4 x 4-11/16 x 12"	172 x 119 x 305 mm 6-3/4 x 4-11/16 x 12"
WEIGHT	11 lb	8 lb
ACCESSORIES SUPPLIED	Hook-Up Leads, 1 red, 1 black Spare Fuse Instruction Manual Schematic Diagram & Parts List	Hook-Up Leads, 1 red, 1 black Spare Fuse Instruction Manual Schematic Diagram & Parts List

CONTROLS AND INDICATORS

INDICATORS

Either the "CC" or "CV" indicator will be lighted whenever the unit is operating, thus serving as a pilot light. The unit automatically changes from CV to CC operation when the preset current limit is reached.

1. **C.C. (Constant Current) Indicator.** Red LED lights in constant current mode. Unit regulates output current at value set by CURRENT controls.
2. **C.V. (Constant Voltage) Indicator.** Green LED lights in constant voltage mode. Unit regulates output voltage at value set by VOLTAGE controls.

VOLTAGE CONTROLS

3. **COARSE Control.** Coarse adjustment of output voltage. Read value on V meter.
4. **FINE Control.** Fine adjustment of output voltage. Read value on V meter.

CURRENT CONTROLS

5. **CURRENT Control.** Adjusts current limit in constant voltage mode. Adjusts constant current value in constant current mode. Range of adjustment is determined by HI-LO switch.
6. **HI-LO Switch.** HI position selects high current range; value is read on top meter scale of A meter. LO position selects low current range; value is read on bottom meter scale of A meter.

RANGE	MODEL 1630	MODEL 1610
HI	0 to 3 A	0 to 1 A
LO	0 to 1.5 A	0 to 0.5 A

POWER CONTROLS

7. **ON-OFF Switch.**

OUTPUT TERMINALS

8. **"+" Terminal (Red).** Positive polarity output terminal.
9. **GND Terminal (Green).** Earth and chassis ground.
10. **"–" Terminal (Black).** Negative polarity output terminal.

METERS

11. **A Meter.** Reads output current in amperes. Use top scale when HI-LO switch is set to HI, bottom scale when switch is set to LO.
12. **V Meter.** Reads output voltage on 0 to 32 V scale.

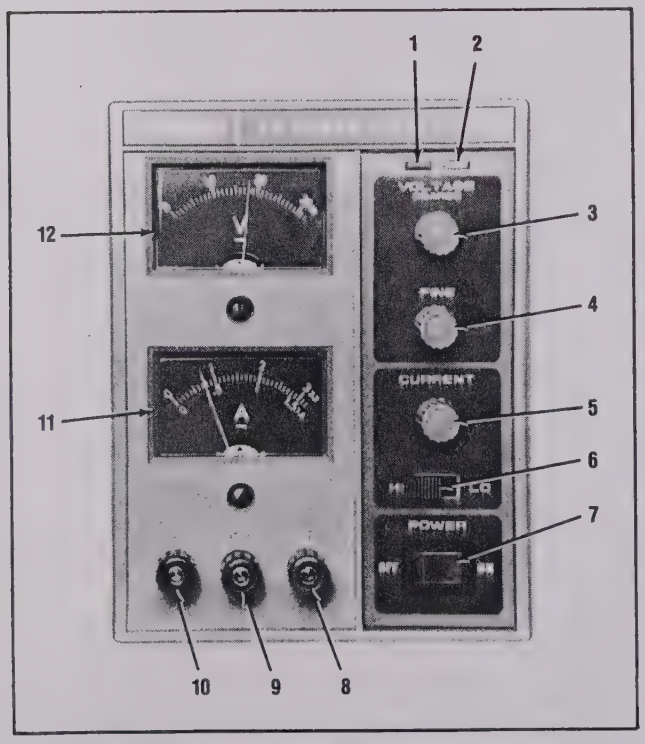


Fig. 1. Front Panel Controls and Indicators.

REAR PANEL CONTROLS

13. Fuse.
14. Power Cord.

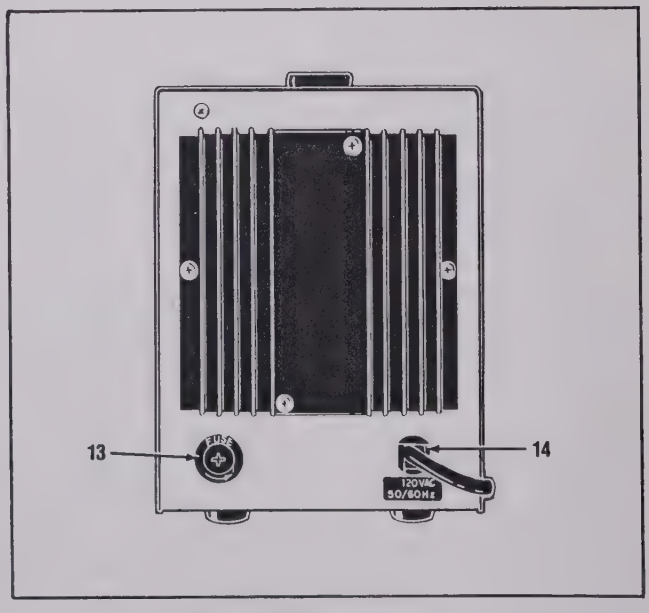


Fig. 2. Rear Panel.

OPERATING INSTRUCTIONS

SAFETY PRECAUTIONS

Use only a polarized 3-wire ac outlet. This assures that the power supply chassis, case, and ground terminal are connected to a good earth ground and reduces danger from electrical shock.

There is little danger of electrical shock from the power supply output, which produces a maximum of 30 volts dc. *However, there may be great danger of electrical shock if the power supply output is connected to an external high voltage.* Some equipment being powered may contain high voltage and present a shock hazard. Observe caution. If the power supply output is floated (referenced to a voltage rather than earth ground) turn off the power supply *and the equipment under test* when making connections. Never float the power supply to a potential greater than 500 volts peak with respect to earth ground.

EQUIPMENT PRECAUTIONS

Avoid using the power supply in ambient temperatures above +40° C. Always allow sufficient air space around the heat sink at the rear of the power supply for effective radiation to prevent internal heat build-up.

Although the power supply is protected against reverse polarity damage, the circuit being powered may not include such protection. Always carefully observe polarity; incorrect polarity may damage the equipment under test.

Do not exceed the voltage rating of the circuit being powered. Many transistors and integrated circuits will not withstand voltage of 30 volts.

There is no need to worry about voltage spikes or overshoot damaging the equipment under test. The voltage between the output terminals of the power supply never exceeds the preset value as the POWER switch is turned on or off.

HOOK-UP

1. Turn off the power supply and the equipment to be powered during hook-up.
2. Connect the positive polarity of the device being powered to the red (+) terminal of the power supply.
3. Connect the negative polarity of the device being powered to the black (-) terminal of the power supply.

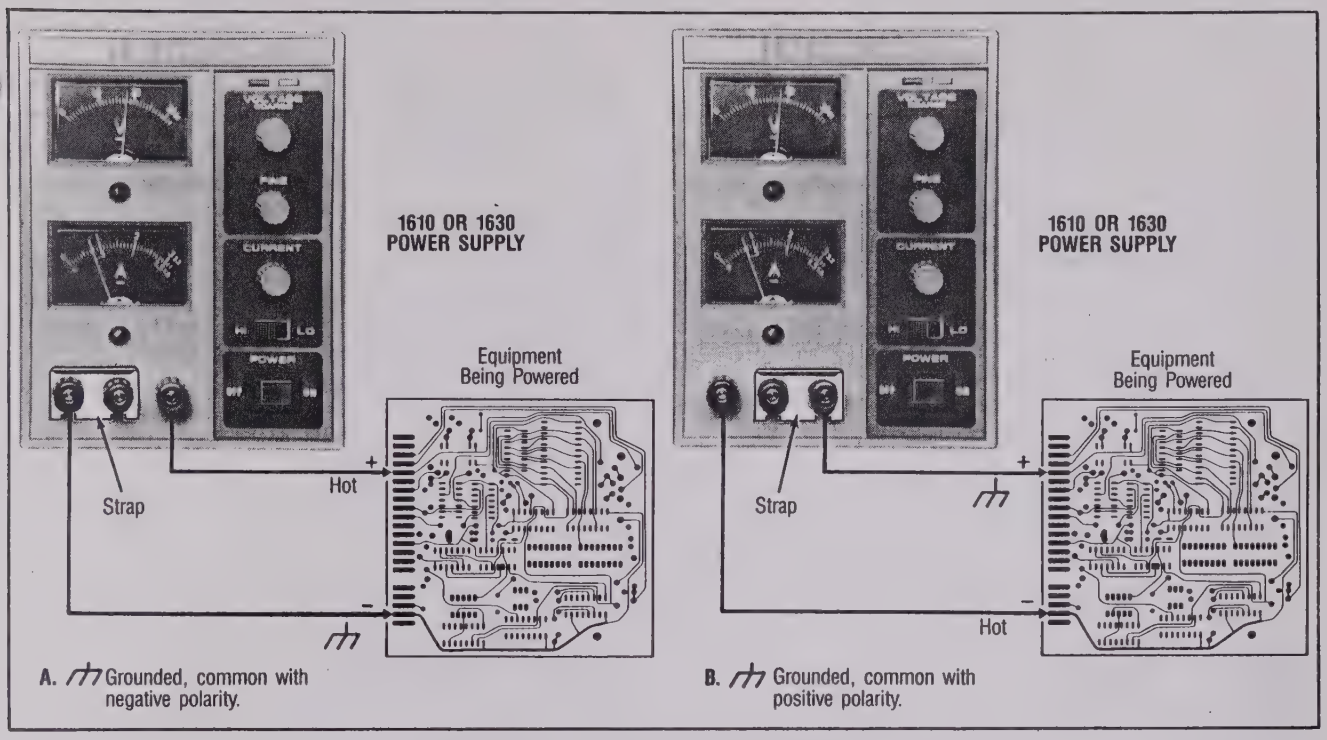


Fig. 3 (A and B). Grounding Possibilities.

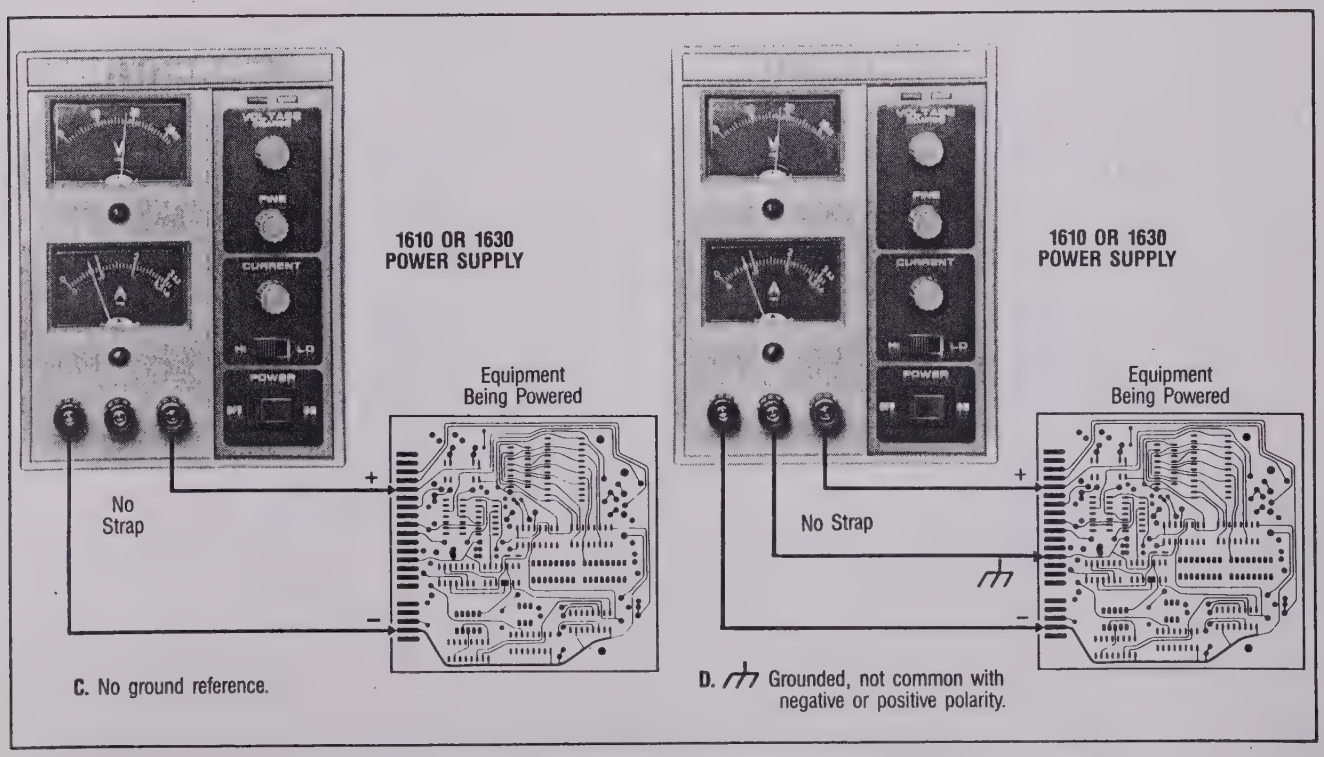


Fig. 3 (C and D). Grounding Possibilities.

4. Fig. 3 illustrates the grounding possibilities.

   a. If the negative polarity of the equipment or circuit being powered is also the chassis or common, it may be grounded to earth by strapping the black (-) terminal to the green (GND) terminal as shown in Fig. 3A.

   b. Similarly, the positive polarity can be grounded by strapping the red (+) terminal to the green (GND) terminal as shown in Fig. 3B.

   c. If an earth ground reference is not required, the configuration of Fig. 3C may be used. The scheme in Fig. 3C should also be used where it is not known whether the chassis is common with either the positive or negative polarity.

   d. If the chassis or common of the equipment being powered is separate from both the positive and negative polarity power inputs, use the connection shown in Fig. 3D.

5. Observe proper polarity. If the circuit being powered is not equipped with reverse polarity protection, damage to the circuit can result from reverse polarity. Use color coded hook-up leads, such as the set supplied with the power supply, for convenience in identifying polarity, red for (+) and black for (-).

6. Make sure that the hook-up leads offer sufficient current capability and low resistance between the power supply and the circuits being powered. The hook-up leads supplied with the power supply are rated for 3 amps.

TYPICAL CONSTANT VOLTAGE OPERATION

1. Before connecting the device to be powered to the power supply, determine the maximum safe load current for the device to be powered and set the current limit value (see "Setting Current Limit" procedure in this section).

2. Set FINE VOLTAGE control to center and COARSE VOLTAGE control to minimum (fully counterclockwise).

3. Turn off power supply and connect it to the device to be powered (see "Hook-Up" procedure in this section).

4. Turn on POWER switch. The CV indicator should light.

5. Increase the VOLTAGE setting until the V meter reads the desired value. The FINE control permits easier setting to a specific value.

6. Note the load current on the ammeter.

7. If the load current exceeds the preset current limit, the CV indicator will go off and the CC indicator will light. In this case, the power supply automatically switches to the constant current mode, and further rotation of the VOLTAGE control will not increase the output voltage as read on the V meter.

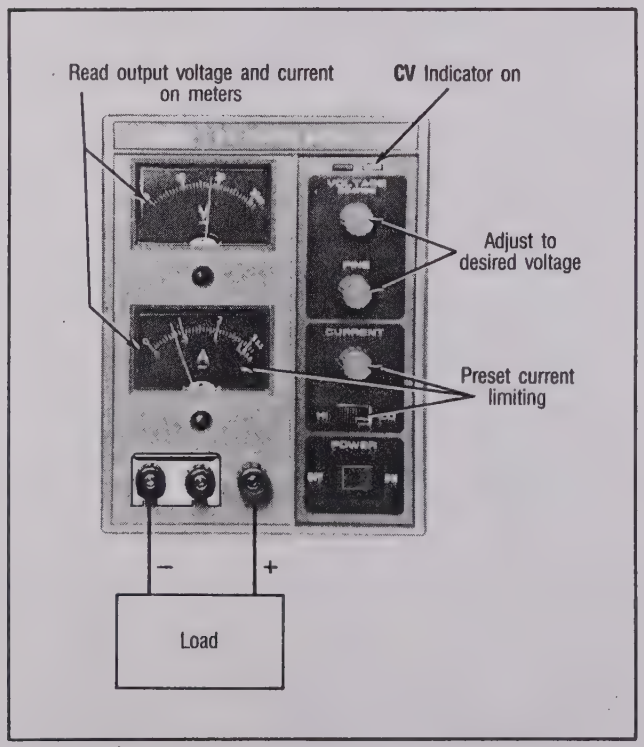


Fig. 4. Typical Constant Voltage Operation.

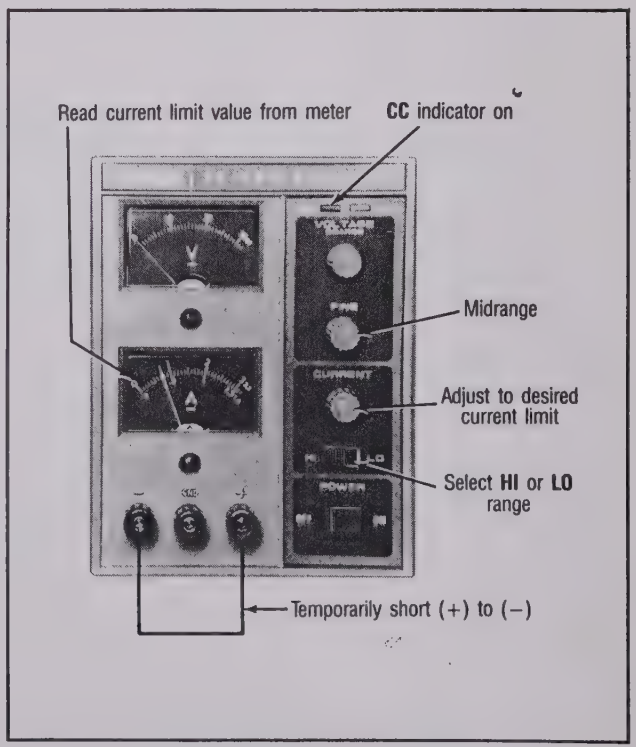

Read current limit value from meter
CC indicator on
Midrange
Adjust to desired current limit
Select HI or LO range
Temporarily short (+) to (–)

Fig. 5. Setting Current Limit.

SETTING CURRENT LIMIT

1. Determine the maximum safe current for the device to be powered. If that value is greater than 0.5 A for Model 1610, or greater than 1.5 A for Model 1630, set the HI-LO switch to HI. If less than these values, set HI-L0 switch to LO.

2. Temporarily short the (+) and (-) terminals of the power supply together with a test lead.

3. Rotate the COARSE VOLTAGE control away from zero sufficiently for the CC indicator to light.

4. Adjust the CURRENT control for the desired current limit. Read the current value on the A meter.

5. The current limit (overload protection) has now been preset. Do not change the CURRENT control setting after this step.

6. Remove the short between the (+) and (-) terminals and hook up for constant voltage operation.

TYPICAL CONSTANT CURRENT OPERATION

1. Before connecting the device to be powered to the power supply, determine the maximum safe voltage to be applied and set the VOLTAGE controls to obtain that voltage reading on the V meter.

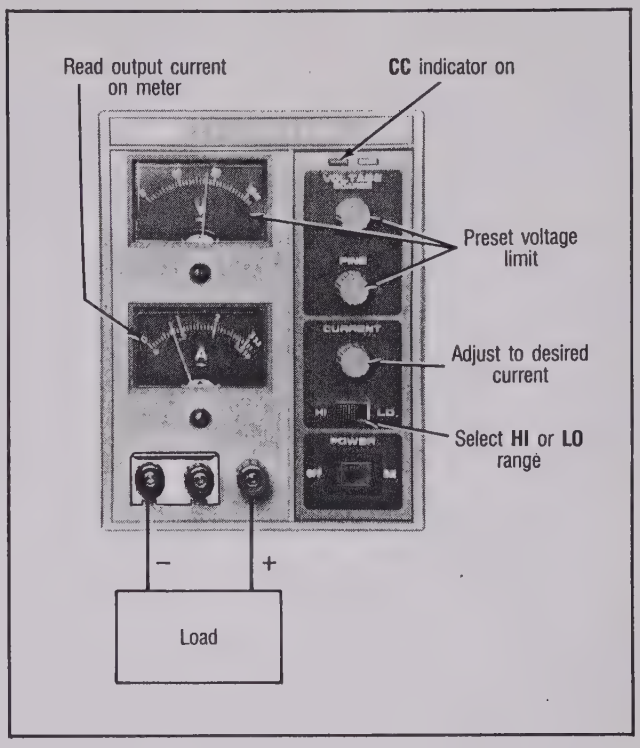


Fig. 6. Typical Constant Current Operation.

2. Determine the desired constant current value. If greater than 0.5 A for Model 1610, or greater than 1.5 A for Model 1630, set the HI-L0 switch to HI. If less than these values, set the HI-L0 switch to LO.
3. Set the CURRENT control to minimum (fully counter-clockwise).
4. Turn off the power supply and connect it to the device to be powered.
5. Turn on the power supply. The CC indicator should light.
6. Increase the CURRENT control setting until the desired constant current value is read on the A meter, or set the current limit in advance (before connecting the load) as prescribed in the earlier "Setting Current Limit" procedure
7. If the load current drops below the constant current value, the CC indicator will go off and the CV indicator will light. In this case, the power supply automatically switches to the constant voltage mode, and further rotation of the CURRENT control will not increase the output current as read on the A meter.

CONSTANT VOLTAGE/CONSTANT CURRENT CHARACTERISTIC

The working characteristic of the Model 1610 and 1630 Power Supplies is called a constant voltage/constant current automatic crossover type. This permits continuous transition from constant current to constant voltage modes in response to the load change. The intersection of constant voltage and constant current modes is called the crossover point. Fig. 7 shows the relationship between this crossover point and the load.

For example, if the load is such that the power supply is operating in the constant voltage mode, a regulated output voltage is provided. The output voltage remains constant as the load increases, up until the point where the preset current limit is reached. At that point, the output current becomes constant and the output voltage drops in proportion to further increases in load. The crossover point is indicated by the front panel LED indicators. The crossover point is reached when the CV indicator goes off and the CC indicator comes on.

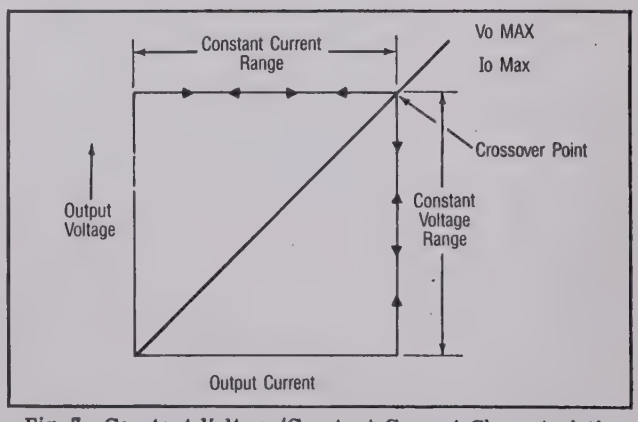


Fig. 7. Constant Voltage/Constant Current Characteristic.

Similarly, crossover from the constant current to the constant voltage mode automatically occurs from a decrease in load. A good example of this would be seen when charging a 12-volt battery. Initially, the open circuit voltage of the power supply may be preset for 13.8 volts. A low battery will place a heavy load on the supply and it will operate in the constant current mode, which may be adjusted for a 1 amp charging rate. As the battery becomes charged, and its voltage approaches 13.8 volts, its load decreases to the point where it no longer demands the full 1 amp charging rate. This is the crossover point where the power supply goes into the constant voltage mode.

CONNECTING TWO POWER SUPPLIES IN SERIES

Two Model 1610 or 1630 power supplies may be connected in series to provide a variable 0-60 volt output. In this configuration, two 1610's provide up to 1 amp; two 1630's provide up to 3 amps. See Fig. 8 for the connection scheme.

When connected in series, the VOLTAGE controls of each power supply exercise control over a 0-30 volt range. Add the two V meter readings together to determine the total output voltage, or an external voltmeter may be connected across the load.

Load current may be monitored from either supply; the readings will be identical since they are connected in series. Also, since the supplies are connected in series, it is only necessary to set the current limit on one of the supplies; the other may be set for maximum.

CONNECTING TWO POWER SUPPLIES IN PARALLEL

Two power supplies may be connected in parallel to double the maximum load current. In this configuration, two 1610's will provide a variable 0-30 volt output at up to 2 amps; two 1630's will provide a 0-30 volt output at up to 6 amps (heavier gauge hook-up leads are advisable). Current equalizing resistors must be used as shown in Fig. 9. However, the protective current limiting feature will prevent damage if current is temporarily unbalanced during set-up.

When connected in parallel and operating in the constant voltage mode, determine the total load current limit and preset the current limiting for each power supply to half the total load current value. Then when the load is connected, set the VOLTAGE controls on the two power supplies for equal voltage readings on the V meters. This should also provide approximately equal current from each supply, as read on the A meters. Add the two A meter readings together for total load current, or connect an external ammeter in series with the load.

If the current equalizing resistors are not well matched, it is preferable that the voltages be slightly unbalanced to achieve current balance. Be sure that the supplies are adequately balanced so that both remain in the CV mode.

When connected in parallel and operating in the constant current mode, the VOLTAGE controls of both supplies should be preset to the same value. Then when the load is connected, the CURRENT controls of the two supplies should be adjusted for approximately equal current from each unit. Be sure that both supplies remain in the CC mode.

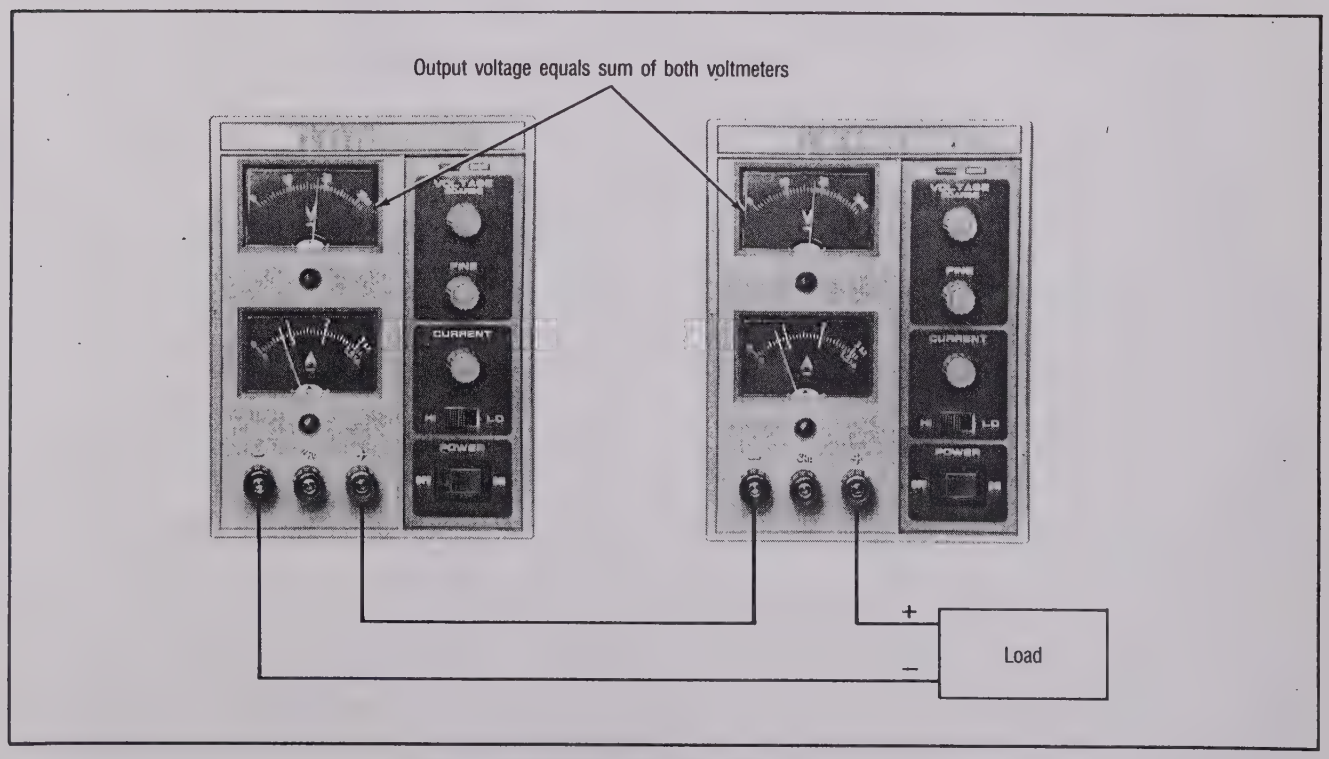


Fig. 8. Connecting Two Power Supplies in Series.

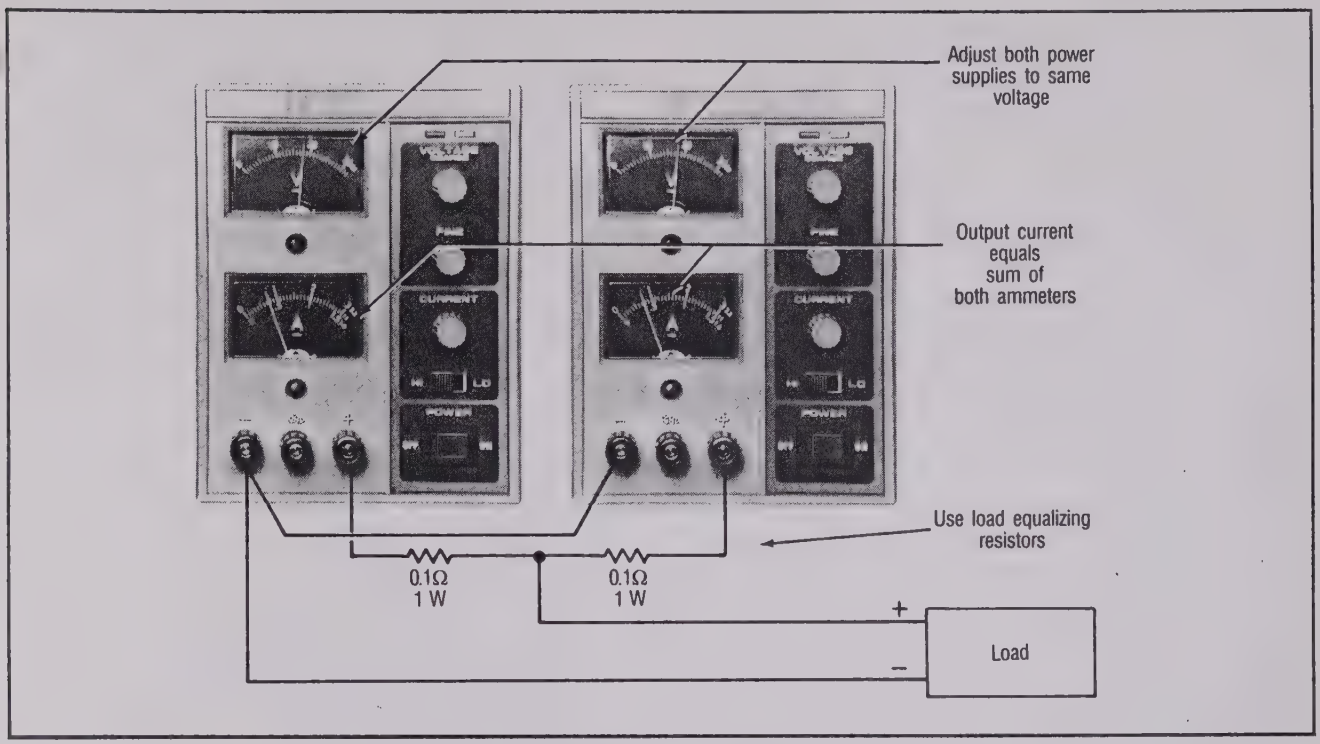


Fig. 9. Connecting Two Power Supplies in Parallel.

APPLICATIONS

GENERAL

The Model 1610 and 1630 power supplies have a very wide variety of applications in electrical and electronics servicing, engineering laboratories, manufacturing and testing facilities, schools, and home hobbying. The power supply output is fully adjustable from 0 to 30 volts, and 0 to 1 amp (Model 1610) or 0 to 3 amps (Model 1630). This flexibility makes them suitable for most applications requiring a dc power source.

ELECTRONICS SERVICING

Most electronics troubleshooting and repair is performed on a test bench. This power supply can provide the dc power source to operate a module or circuit board on the test bench when it is removed from its parent equipment. It can be used to power portable, battery-operated equipment and check the effect of low battery voltage. It can power vehicular equipment such as tape players, auto sound systems, CB radios, etc. on the test bench.

Most automobiles and other vechicles use 12-volt electrical systems. Although the electrical system is normally referred to as a 12-volt system, actual battery voltage when fully charged is approximately 14 volts. The power supply may be set to 14 volts for servicing equipment from vehicles with 12-volt electrical systems. Some trucks use a 24-volt elecrical system; bench testing of equipment from these systems should be performed at 28 volts.

Some servicing applications require the injection of a variable dc voltage for certain tests, such as checking the effect of AGC bias in a television receiver. This requires an isolated dc power supply, such as the Model 1610 or 1630. The equipment being tested may contain its own power supply and operate from ac power. A dc voltage may already be present in the circuit. One polarity of the power supply output is floated to an appropriate point in the circuit, such as the emitter of a transistor. The other polarity of the power supply output is then applied to another point in the circuit, such as the base of that transistor. Varying the power supply voltage then varies the dc bias on the stage, and the effects may be noted. A series limiting resistor is often used to protect the circuits from overdissipation.

ELECTRONICS MANUFACTURING

In electronics manufacturing facilities, the power supply is often used as a dc power source while testing and adjusting modules, subassemblies, and complete units in the production and assembly area or in the quality control area. The instrument could be used in incoming inspection as a dc power source for testing purchased components and subassemblies.

This power supply is particularly well suited for manufacturing applications because of its ease of operation and its continuous duty rating. When load current or total power dissipation are among the main characteristics to be measured, the total load current and voltage are instantly displayed on the two meters. The current limit can be set so that all units which do not meet the load current specification will cause the CC indicator to light, and the unit can be rejected.

ELECTRONICS DESIGN LAB

The technician or engineer working in an engineering laboratory requires a dc power supply to power breadboard and prototype circuits. This power supply is ideal because it monitors both current and voltage simultaneously, limits current to protect the circuit, is adjustable over a wide range, and has excellent regulation and very low ripple.

Use of the instrument in an engineering laboratory is very similar to that described for servicing electronics equipment and modules, except that lower currents may be prevalent when powering individual circuits. The current limiting feature is very valuable in this application because it can protect unproven circuits from damage.

ELECTRONICS EDUCATION

The student in an electronics curriculum may use the power supply for powering equipment and circuits as previously described for all other applications. In addition, the power supply can be used in the classroom laboratory to conduct experiments in fundamental electronics. In learning Ohm's law, for example, the relationships of resistance, current, and voltage are vividly demonstrated by the use of a power supply. Being able to observe both the current and voltage meter simultaneously is a great aid in such experiments.

BATTERY CHARGING

The power supply can be used as a battery charger to restore the charge in rechargeable batteries such as lead-acid, nickel-cadmium, and some alkaline types. Refer to the battery manufacturer's charging specifications for proper voltage and current settings. Charging information is sometimes printed on the batteries. Battery charging, at least initially, requires the constant current mode of operation. Before connecting the power supply to the battery, preset the VOLTAGE controls to the fully charged terminal voltage specified by the battery manufacturer. Turn off the power supply while connecting the battery. Observe proper polarity and connect as for constant current operation. Adjust the CURRENT control for the maximum charging current specified by the battery manufacturer (If the maximum charging current is greater than the power supply's maximum load current, set the CURRENT control to maximum). The CC indicator will light and the battery will charge at the preset current limit, which can be read on the A meter. As the battery approaches full charge, its terminal voltage will approach that of the power supply output and the charging current will taper off. The power supply may automatically switch to CV (constant voltage) operation. When this occurs, the power supply will continue to provide a trickle charge.

MAINTENANCE

WARNING

The following instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing other than contained in the operating instructions unless you are qualified to do so.

FUSE REPLACEMENT

If the fuse blows, the CV or CC indicators will not light and the power supply will not operate. The fuse should not normally open unless a problem has developed in the unit. Try to determine and correct the cause of the blown fuse, then replace only with a fuse of the correct rating as listed below. The fuse is located on the rear panel (see Fig. 2).

MODEL	OPERATION	FUSE VALUE
1610	110/120 V 220/240 V	1 A 0.5 A
1630	110/120 V 220/240 V	3 A 1.5 A

Table 1. Fuse Values.

LINE VOLTAGE CONVERSION

The primary winding of the power transformer is tapped to permit operation from 110, 120, 220, or 240 VAC, 50/60 Hz line voltage. Conversion from one line voltage to another is done by a simple wiring change as shown in Fig. 10.

A label on the rear panel identifies the line voltage to which the unit was factory wired. To convert to a different line voltage, perform the following procedure:

1. Make sure the power cord is unplugged.
2. Remove the case and locate the power transformer.
3. Rewire the power transformer to the desired line voltage as shown in Fig. 10. Insulate the ends of the unused transformer tap wires.
4. A change in line voltage may also require a corresponding change of fuse value. Install the correct fuse value as listed in Table 1.
5. Replace the cover.
6. Affix a label showing the correct line voltage for the unit after conversion. Place this label directly over the factory label.

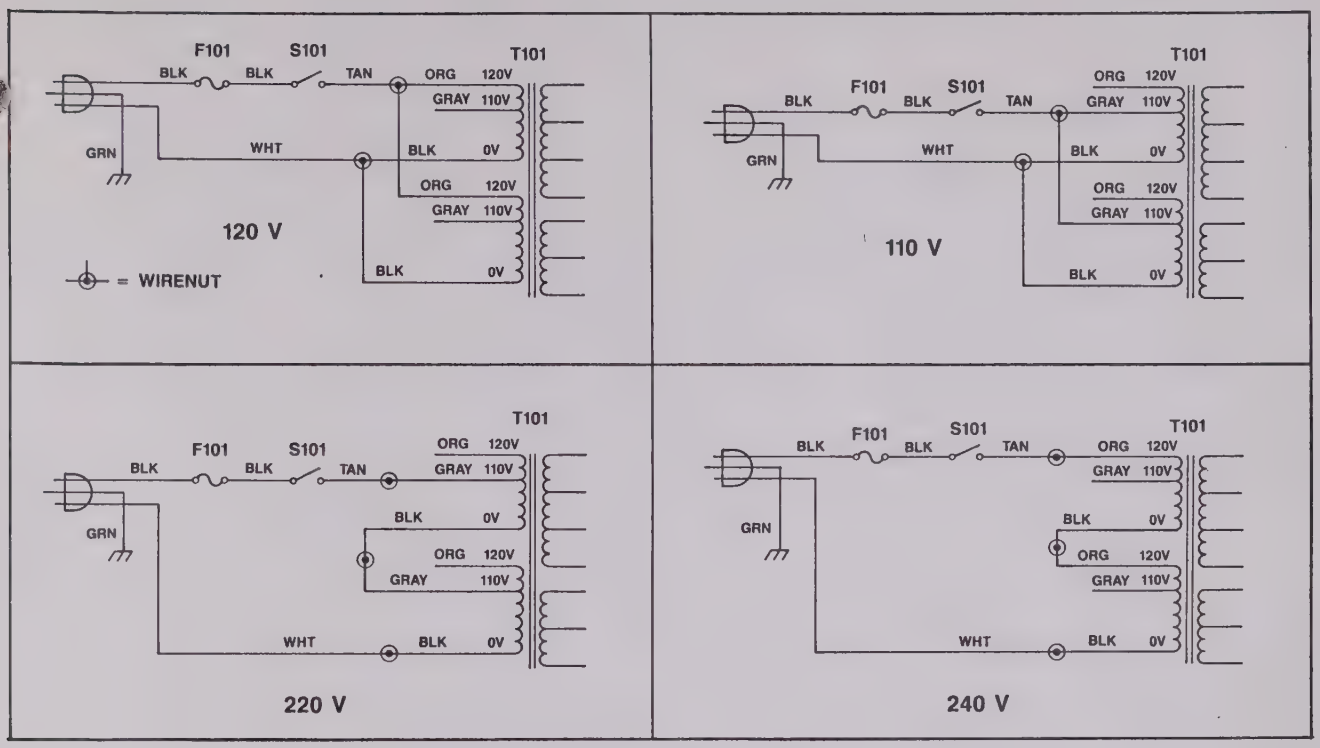


Fig. 10. Line Voltage Conversion.

ADJUSTMENTS

This unit was accurately adjusted at the factory before shipment. Readjustment is recommended only if repairs have been made in a circuit affecting adjustment accuracy, or if you have a reason to believe the unit is out of adjustment. However, adjustments should be attempted only if a multimeter with an accuracy of ±0.5% dcv or better is available (B & K-Precision Model 2807 or equivalent).

If readjustment is required, use the following procedure. Locations of the adjustments are shown in Fig. 11.

1. Connect an accurate (±0.5%) external multimeter to measure the dc voltage at output terminals of the power supply.
2. Set the COARSE and FINE VOLTAGE controls to minimum (fully counterclockwise).
3. Adjust trimmer pot VR105 for a reading of 0 volts on the multimeter.
4. Turn the COARSE and FINE VOLTAGE controls to maximum (fully clockwise).
5. Adjust trimmer pot VR104 for a reading of 32 volts on the multimeter.
6. Set the COARSE and FINE VOLTAGE controls for a reading of 30.0 volts on the multimeter.
7. Adjust trimmer pot VR107 for a reading of 30.0 volts on the V meter of the power supply.
8. Set the CURRENT control to minimum (fully counterclockwise).
9. Connect the external multimeter to measure dc current at the output terminals of the power supply. Select a current range capable of measuring at least 3.2 amps for Model 1630, or at least 1.05 amp for Model 1610.
10. Set the COARSE and FINE VOLTAGE controls to a centered position.
11. Set the HI-LO switch to HI and increase the CURRENT control setting to maximum (fully clockwise).
12. Adjust trimmer pot VR106 for a reading of 3.2 amp on the multimeter for Model 1630, or 1.04 amp for Model 1610.
13. Readjust the CURRENT control for a reading of 3.0 amps on the multimeter for Model 1630, or 1.0 amp for Model 1610.
14. Adjust trimmer pot VR108 to calibrate the A meter of the power supply for the same reading as the multimeter.
15. Set the HI-LO switch to LO and readjust the CURRENT control for a reading of 1.5 amps on the multimeter for Model 1630, or 0.5 amp for Model 1610.
16. Adjust trimmer pot VR109 to calibrate the A meter of the power supply for the same reading as the multimeter.

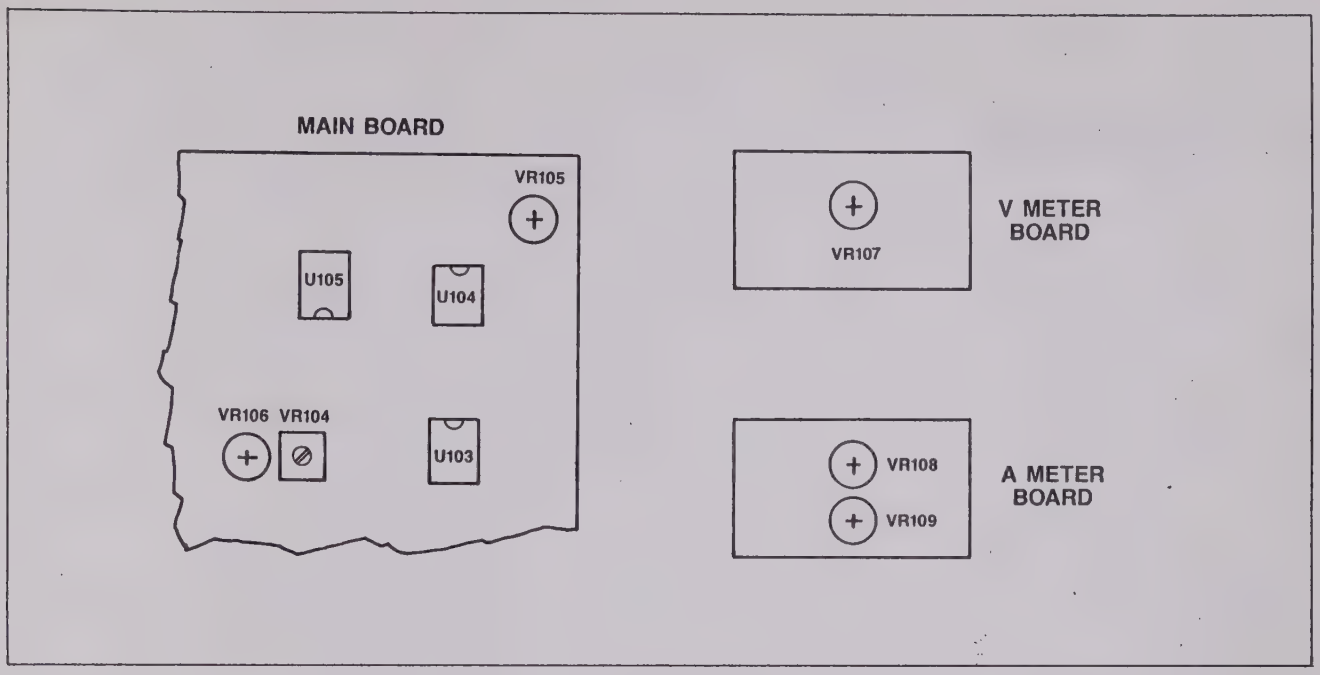


Fig. 11. Location of Adjustments.

WARRANTY SERVICE INSTRUCTIONS
(For U.S.A. and its Overseas Territories)

1. Refer to the MAINTENANCE section of your **B & K-Precision** instruction manual for adjustments that may be applicable.

2. If the above-mentioned does not correct the problem you are experiencing with your unit, pack it securely (preferably in the original carton or double-packed). Enclose a letter describing the problem and include your name and address. Deliver to, or ship PREPAID (UPS preferred in U.S.A.) to the nearest **B & K-Precision** authorized service agency (see list enclosed with unit).

If your list of authorized **B & K-Precision** service agencies has been misplaced, contact your distributor for the name of your nearest service agency, or write to:

B & K-Precision, Dynascan Corporation
Factory Service Operations
6460 West Cortland Street
Chicago, Illinois 60635
Tel (312) 889-8870
Telex: 25-3475

Also use this address for technical inquiries
and replacement parts orders.

LIMITED ONE-YEAR WARRANTY

DYNASCAN CORPORATION warrants to the original purchaser that its **B & K-Precision** product, and the component parts thereof, will be free from defects in workmanship and materials for a period of one year from the date of purchase.

DYNASCAN will, without charge, repair or replace, at its option, defective product or component parts upon delivery to an authorized **B & K-Precision** service contractor or the factory service department, accompanied by proof of the purchase date in the form of a sales receipt.

To obtain warranty coverage in the U.S.A., this product must be registered by completing and mailing the enclosed warranty registration card to DYNASCAN, **B & K-Precision**, 6460 West Cortland Street, Chicago, Illinois 60635 within fifteen (15) days from the date of purchase.

Exclusions: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. It is void if the serial number is altered, defaced or removed.

DYNASCAN shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific rights and you may also have other rights which vary from state to state.

For your convenience we suggest you contact your **B & K-Precision** distributor, who may be authorized to make repairs or can refer you to the nearest service contractor. If warranty service cannot be obtained locally, please send the unit to **B & K-Precision** Service Department, 6460 West Cortland Street, Chicago, Illinois 60635, properly packaged to avoid damage in shipment.

B & K-Precision Test Instruments warrants products sold only in the U.S.A. and its overseas territories. In other countries, each distributor warrants the **B & K-Precision** products which it sells.

TEST INSTRUMENT SAFETY

(continued from inside front cover)

2. Use only a polarized 3-wire ac outlet. This assures that the power suppply chassis, case, and ground terminal are connected to a good earth ground and reduces danger from electrical shock.

3. Don't expose high voltage needlessly. Remove housings and covers only when necessary. Turn off equipment while making test connections in high-voltage circuits. Discharge high-voltage capacitors after removing power.

4. If possible, familiarize yourself with the equipment being tested and the location of its high voltage points. However, remember that high voltage may appear at unexpected points in defective equipment.

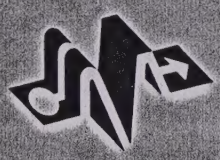
5. Use an insulated floor material or a large, insulated floor mat to stand on, and an insulated work surface on which to place equipment; and make certain such surfaces are not damp or wet.

6. Use the time-proven "one hand in the pocket" technique while handling an instrument probe. Be particularly careful to avoid contacting a nearby metal object that could provide a good ground return path.

7. When testing ac powered equipment, remember that ac line voltage is usually present on some power input circuits such as the on-off switch, fuses, power transformer, etc. any time the equipment is connected to an ac outlet, even if the equipment is turned off.

8. Some equipment with a two-wire ac power cord, including some with polarized power plugs, is the "hot chassis" type. This includes most recent television receivers and audio equipment. A plastic or wooden cabinet insulates the chassis to protect the customer. When the cabinet is removed for servicing, a serious shock hazard exists if the chassis is touched. Not only does this present a dangerous shock hazard, but damage to test instruments or the equipment under test may result from connecting an earth ground lead of a test instrument to a "hot chassis". To make measurements in "hot chassis" equipment, always connect an isolation transformer between the ac outlet and the equipment under test. The **B & K-Precision** Model TR-110 or 1604 Isolation Transformer, or Model 1653 or 1655 AC Power Supply is suitable for most applications. To be on the safe side, treat all two-wire ac powered equipment as "hot chassis" unless you are sure it has an isolated chassis or an earth ground chassis.

9. Never work alone. Someone should be nearby to render aid if necessary. Training in CPR (cardio-pulmonary resuscitation) first aid is highly recommended.



BK PRECISION

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